Electronic Supplementary Material (ESI) for Soft Matter
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Electronic Supplementary Information (ESI)

Micro-patterns of Reduced Graphene Oxide (RG-O) Platelets Crafted by Self-Assembled Template

Poly(ionic liquid)-modified Reduced Graphene Oxide (PIL:RG-O). Graphite oxide (GO) was prepared using modified Hummer's method[1], and the dried GO powder was suspended in water by sonication. The sample for AFM measurent was prepared by spin coating an aqueous suspension of graphene oxide (G-O) of 0.5 mg mL^{-1} on Si/SiO_2 wafer at 2,000 rpm. Atomic force microscopy (AFM) measurements were performed in tapping mode with an AFM XE-100 (Park System).**Fig. S-1a** shows AFM images of the obtained G-O, which displays an individual sheet with longest lateral dimension up to ~5μm.

Poly(ionic liquid)-modified reduced graphene oxide (PIL:RG-O) was prepared according to the previous literatures.[2-3] **Fig. S-1b** shows TGA curve of PIL:RG-O in comparison with unmodified RG-O. TGA measurement was performed at a heating rate of 10 ^{o}C min^{-1} under nitrogen flow using a NETZSCH STA 409 PC/PG instrument.The pristine RG-O shows a continuing weight loss related to the removal of physisorbed water and decomposition of residual oxygen-based funtional groups. In case of PIL:RG-O, there is a significant weight loss (~ 25%) in the temperature range of 320 - 430^{o}C,which is attributed to the decomposition of the surface-bound PIL molecules.

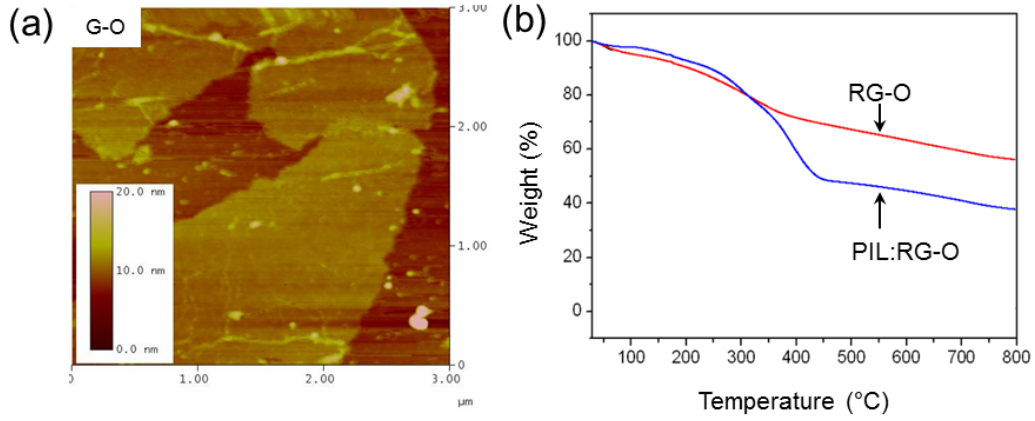

Fig.S-1. (a) AFM image of G-O and (b) TGA curves of RG-O and PIL:RG-O.

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Controlled Evaporative Self-Assembly. Poly(methymethacrylate) (PMMA) patterns were first producedand used as a guiding template for PIL:RG-O patterns. As the dimension of the resulting PIL:RG-O pattern is directly related to that of PMMA patterns, it is of interest to see whether the width and interval of PMMA patterns could be controlled by evaporation induced self-assembly method. For this purpose, we carried out an experiment where the concentration of solute in solution (*i.e.*, the concentration of PMMA in toluene) was varied.

Fig. S-2 shows the variation in the width and interval of PMMA patterns as a function of the concentration in solution. (x=3200 μm, x denotes the distance from the contact center) As PMMA concentration was increased, the width of patterns and the center-to-center distance between the patterns increased. This result indicates thatthe dimension of PMMA patterns can be controlled by careful adjustment of experimental parameters. (*e.g.*, PMMA concentration in solution)

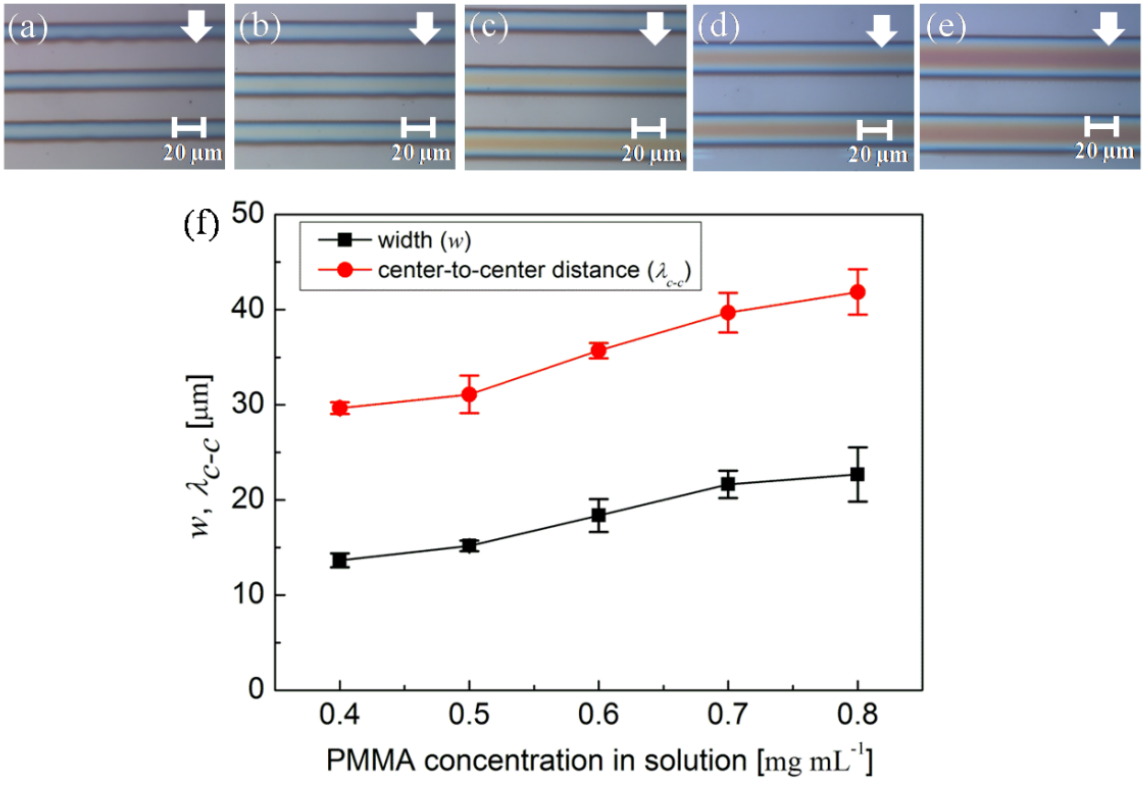

Fig.S-2. Optical microscope images of PMMA patterns derived at different PMMA toluene solution concentration: (a) 0.4, (b) 0.5, (c) 0.6, (d) 0.7, and (e) 0.8 mg mL^{-1}. The white arrows mark the

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direction of the movement of the solution front. (f) The width of PMMA pattern, *w*, and the average spacing between adjacent patterns, λ, as a function of PMMA toluene solution concentration.

References

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